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Prevalence and distribution of gastro-intestinal helminthes in local chickens in Al-Diwaniya region

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أنتشار وتوزيع الديدان المعدية-المعوية في الدجاج المحلي في مدينة الديوانية

هادي مدلول حمزة الميالي/ جامعة القادسية / كلية التربية/ قسم علوم الحياة

الخلاصة

أجريت هذة الدراسة لتحديد انتشار وتوزيع الا صابة بالديدان المعوية في الدجاج المحلي المربى منزلياً وشملت مائة دجاجة تم جلبها من مناطق مختلفة من مدينة الديوانية .

أظهرت الدراسة أصابة 97% منها بنوع واحد او اكثر من الديدان المعوية حيث تم تسجيل احد نوعا منها خمسة انواع من الديدان الشريطية وستة من الديدان الخيطية وهي:

Raillietina echinobothrida (81.44%), *Hymenolepis cantainana* (65.97%), *R. tetragona* (59.79%), *R.cesticillus* (12.37%), *Choanotaenia infundibulum* (13.47%), *Heterakis gallinarum* (24.74%), *Ascaridia galli* (31.95%)),*Epomidiostumum sp*.(12.43%),*Dispharynx nasuta*(5.15%) *Tetrameres americana*.(5.15 %) and finally *Amidostumum anseris* (2.06%).

ولم تسجل أي اصابة بالديدان المخرمة .شكلت الاصابات المختلطةاعلى نسبة مقارنة بالاصابات المنفردة التي شكلت اوطأ نسبة من مجموع الاصابات الكلية . لم تظهر أي فروق معنوية مهمة احصائياً بين الذكور والاناث من ناحية الاصابة بينما ظهرت فروق معنوية كبيرة في نسبة الاصابة بالديدان الشريطية والخيطية حيث كانت نسبة الاصابة (90.72%, 37.11%)على التوالي .

لوحظ ان اغلب الديدان تتواجد في الامعاء الدقيقة حيث كانت الاصابات فيها اعلى منها في الامعاء الغليظة بينما سجل *Amidostumum* و *Heterakis gallinarum, Epomidiostumum sp.* في القانصة و المستقيم على التوالي . و والنوعان الاول والثاني يسجلان لاول مرة في الدجاج كمضيف نهائي .اخيرا فان هذة الدراسة هي الاولى في المنطقة .

Abctract

The present study was conducted to determine the prevalence of gastro-intestinal helminthes infections in 100 adult local chickens from different places of Al-Diwaniya region. Ninety seven from the examined chickens (97%) were infected with one or more of gastro-intestinal helminthes; a total of eleven specie (5 species of cestode and 6 species of nematode) were detected, The species and their prevalences were: *Raillietina echinobothrida* (81.44%), *Hymenolepis cantainana* (65.97%), *R. tetragona* (59.79%), *R.cesticillus* (12.37%), *Choanotaenia infundibulum* (13.47%), *Ascaridia galli* (31.95%) ,

Heterakis gallinarum (24.74%),*Epomidiostumum sp*.(12.37%),*Dispharynx nasuta*(5.15%) *Tetrameres Americana.* (5.15 %) and finally *Amidostumum anseris* (2.06%). No trematodes were found in present study.

Mixed infections accounted for 87.63% as compared to 12.37% of single infections.Association between chicken sex infection with cestodes and nematodes was not significant (87.23%;34.04%in males and 88.67%. ;37.73% in females respectively .There was statistically significant differences($P<0.05$) in the prevalence rates of cestodes (88%)and nematodes(36%).

Most the parasites were found in the small intestine than the large intestine .Only *Amidostumum anseris, Epomidiostumum sp*. and *Heterakis gallinarum* were recovered from gizzard and caecum respectivelly. *Amidostumum anseris* and *Epomidiostumum sp*. were recorded for the first time in the chickens as intermediate host .This study is the first in the region.

Introduction

Scavenging or backyard poultry husbandry chickens exposes to many types of parasites., It is reared by rural and urban house holders who use their eggs and meat as a source of animal protein and farm manure (1,2). Rural poultry production represents a significant portion of the rural economy, as a source of income for smallholder farmers. In addition, both poultry meat and eggs are affordable sources of protein; hence chickens play an important role in the provision of animal protein for the rural population (3). Gastrointestinal parasites which invade the host possess morphological and physiological features such as small thread like cylindrical body, hooks, and hard body cuticle enhance their adaptation to long living and existence in their hosts. These parasites constitute a major factor limiting productivity of the poultry industry by affecting the growth rate of the host resulting in malfunctioning of organs and eventually death (4,5).

Most of the studies conducted in the different parts of the world have indicated that the
proportion of chickens infected by gastro-intestinal parasites is high(3, 5, 7,8,9,10,11, 17,21). Therefore, helminthes are considered to be an important cause of ill health and loss in productivity, in addition
to the losses due to mortality .(3). Of the diseases that reduce productivity of rural poultry, parasitic diseases come first. Even though, parasitic diseases are among the major causes that decrease productivity of chickens, they are often neglected
as they are rarely lethal(12).

The available few data strongly suggest that parasites of chicken, both internal and external, are common in the tropics where the standard of husbandry is poor yet climatic conditions are favorable for the development of parasites. (8).

Helimntheosis was considered to be an important problem of local chickens, Turkey and Doves; helminthes parasites were incriminated as major causes of ill-health and loss of productivity in different parts of Ethiopia, Congo, Mali, Keniya, Morocco ,Tanzaniya and Argentina (3, 7,8,9,10,13,21). In Iraq there is no data about parasites of chickens and this is the first one.
The aim of this study is to evaluate the prevalence of gastro- intestinal helminthes of local chickens in Al-Diwaniya region.

Materials and methods;

The study was conducted from October to December 2006. A total of 100 adults male and female chickens were brought from markets in Al-Diwaniya region. The chickens were then transported to Laboratory of parasitology in department of biology, Education College.

A total of 100 adult local chickens (47 males and 53 females), apparently healthy including both sexes, were brought from local markets in the respective study area., Following the viscera separated from the mesentery were detached in to five pieces; the crop, gizzard, small intestine, large intestine and caecum then put in a separate container. Each piece was identified and incised longitudinally, visible worms to the naked eye were picked up using thumb forceps and the content placed in separate beakers containing physiological saline and all observed parasites recovered and recorded. The mucosa of the intestine were washed to remove any adhering worms and added to the container containing intestinal content. Then the content was sieved, emptied on a Petri dish and examined under low power microscopy (10X). To facilitate subsequent examination and identification,
Worms were stained with lacto phenol for nematodes and acetocarmine stain for cestodes (14) and examined under lower and higher magnification (10X , 40X). Identification of all parasites was carried out using the characters described by Soulsby (4,15,16).

Data analysis

The data of prevalence of gastro-intestinal helminthes and both sexes were analyzed using the Chi-square statistics. In all cases $p<0.05$ was considered statistically significant.

Results

The present study revealed relatively higher overall prevalence of gastro-intestinal helminthes in the local chickens examined. These include 88 (90.72 %) cestodes and 36 (37.11%) nematodes. There was a statistically significant difference ($P<0.05$) in the prevalence rates of cestodes and
Nematodes infection.

The highest infection prevalence was due to *Raillietina echinobothrida* 79 (81.44%), followed by *Hymenolopis cantainana* 64 (65.97%) and *R.tetragona* 58 (59.79%), while *R.cesticillus* 12 (12.37%) and Choanotenia *infundibulum* 13 (13.40 %) were found to be the least frequently recorded cestode species (Table 1 &figures 1-5).

*Ascaridia galli*31 (31.95%) was the most prevalent nematode species followed by *Heterakis gallinarum* 24(24.74%), *Epomidiostumum sp*.12 (12.43%) ,*Dispharynx nasuta* 5(5.15%) while *Tetrameres americana*5 (5.15 %) and *Amidostumum anseris* 2(2.06%)was the least frequently recorded (Table 1) . *Amidostumum anseris* and *Epomidiostumum sp*. was recorded for the first time in the gizzard of chickens .No trematodes were found in this study .There was no differences in prevalence rates of cestodes and nematodes in males (87.23%and 34.04%)and females88.67% and 37.73%) respectively as showed in (Table 2 &figures 6-11) was not statistically significant ($P>0.05$) Among the both sex .While there are statistically significant difference ($P<0.05$) in the prevalence rates of cestodes(88%) and nematodes(36%) .

Mixed infections accounted for 87.63% as compared to 12.37% of single infections (Table 3). All the infected chickens harbored at least three different helminthes species and contained 3–50 helminthes.

Both cestodes and nematodes showed high predilection for specific sites in the gastrointestinal tract of the birds. Most of the helminthes parasites were restricted to the small intestine, The results showed that most of the parasites prefer to colonies the small intestine than the large intestine some parasite was recovered in the gizzard and caecum (Tables 4, 5).

TABLE 1: NUMBER AND PERCENTAGE OF LOCAL CHICKENS INFECTED WITH GASTROINTESTINAL PARASITES IN AL_DIWANIYA REGION (N=100).

parasites	No. infected chicken	Percentage (%)
Cestodes		
R. echinobothrida	**79**	**81.44**
Hymenolepis	**64**	**65.97**
cantainana	**58**	**59.79**
Raillietina tetragona	**13**	**13.40**
Choanotaenia infundibulum	**12**	**12.37**
R. cesticillus	**88**	**90.72**
Total infected		
Nematodes		
Ascaridia galli	**31**	**31.95**
Heterakis gallinarum	**24**	**24.74**
Dispharynx nasuta	**5**	**5.15**
Tetrameres sp.	**5**	**5.15**
Epomidiostomum sp.	**12**	**12.37**
Amidostumum anserus	**2**	**2.06**
Total infected	**36**	**37.11**
Total	**97**	**97%**

p<0.05

TABLE 2: NUMBER AND PERCENTAGE OF INFECTED MALES AND FEMALES IN LOCAL CHICKENS INFECTED WITH GASTROINTESTINAL PARASITES (N=100).

Gender	No. Examined	No. Infected	Percentage (%)
Male	**47**	**cestodes 41** **nematodes 16**	**87.23** **34. 04**
female	**53**	**cestodes 47** **nematodes 20**	**88.67** **37.73**
Total	**100**	**cestodes 88** **nematodes 36**	**88** **36**

p<0.05

TABLE 3: NUMBER AND PERCENTAGE OF MIXED AND SINGLE INFECTIONS IN LOCAL CHICKENS INFECTED WITH GASTROINTESTINAL PARASITES (N=97).

Infection type	No. infected	Percentage (%)
Mixed	**85**	**87.63**
Single	**12**	**12.37**
Total	**97**	**100**

p<0.05

TABLE 4: SITE OF CESTODE PARASITES IN THE GASTROINTESTINAL TRACTS OF LOCAL CHICKENS (N=97) .

Site	Parasite	No. infected	Percentage (%)
Small intestine	*Raillietina tetragona*	36	37.11
	R. cesticillus	4	4.12
	R. echinobothrida	49	50.51
	Choanotaenia infundibulum	13	13.40
	Hymenolepis cantainana	30	30.92
Large intestine	*Hymenolepis cantainana*	22	22.68
	Raillietina tetragona	8	8.24
	R. cesticillus	30	30.92
	R. echinobothrida	34	35.05

p<0.05

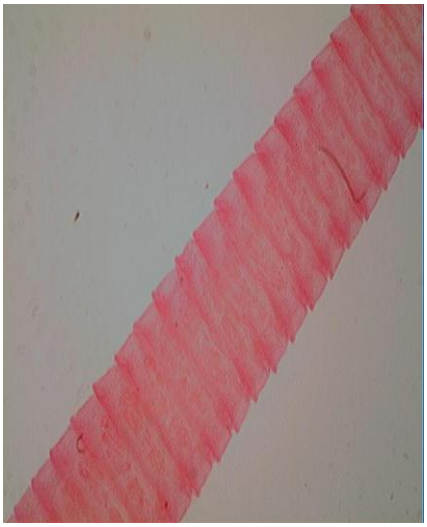
TABLE 5: SITE OF NEMATODE PARASITES IN THE GASTROINTESTINAL TRACTS OF LOCAL CHICKENS (N=97) .

Site	Parasite	No. infected	Percentage (%)
Small intestine	*Heterakis gallinarum*	24	24.74
	Ascaridia galli	20	20.61
	Tetrameres sp.	5	5.15
	Dispharynx nasuta	11	11.34
Large intestine	*Ascaridia galli*	4	4.12
Gizzard	*Amidostumum anseris*	2	2.06
	Epomidiostomum sp.	5	5.15
Caecum	*Heterakis gallinarum*	7	7.21

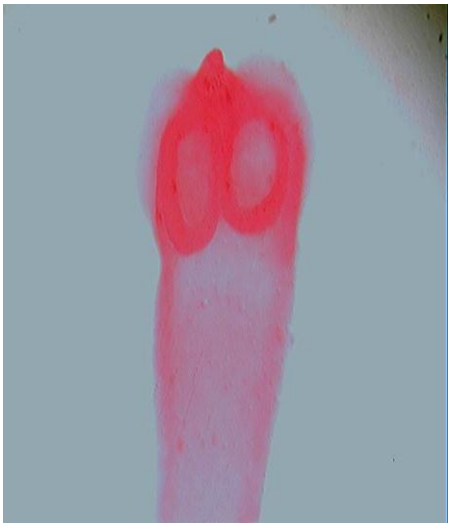
p<0.05

B

A



D



C

Figure 1**:** ***Choanotenia infundibulum*** (acetocarmine stain**).**
A- External morphology.
B, C- Scolex (10,40X).
D- Mature proglottid. (20X).

B

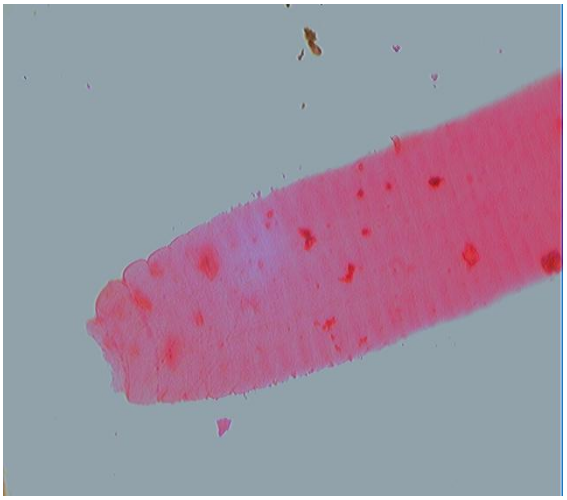
A

D

C

Figure 2: ***Raillietina tetragona***(acetocarmine stain**).**
A- External morphology.
B, C- Scolex (10,20X).
D- Gravid proglottid (40X).

B A

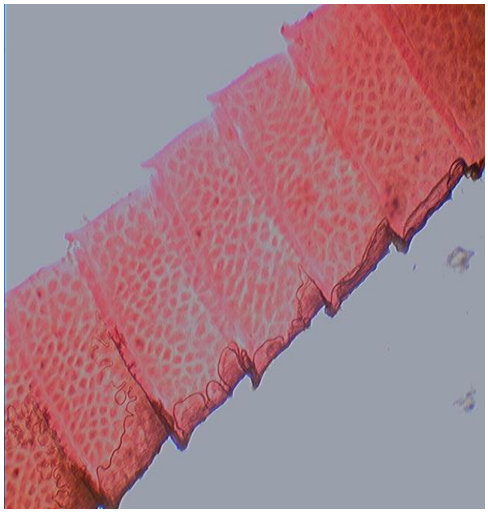


C

Figure 3 :***Hymenolepis cantainana*** (acetocarmine stain**).**
A- External morphology. (10 X).
B - Mature proglottids (40 X).

C- Gravid proglottids (20 X).

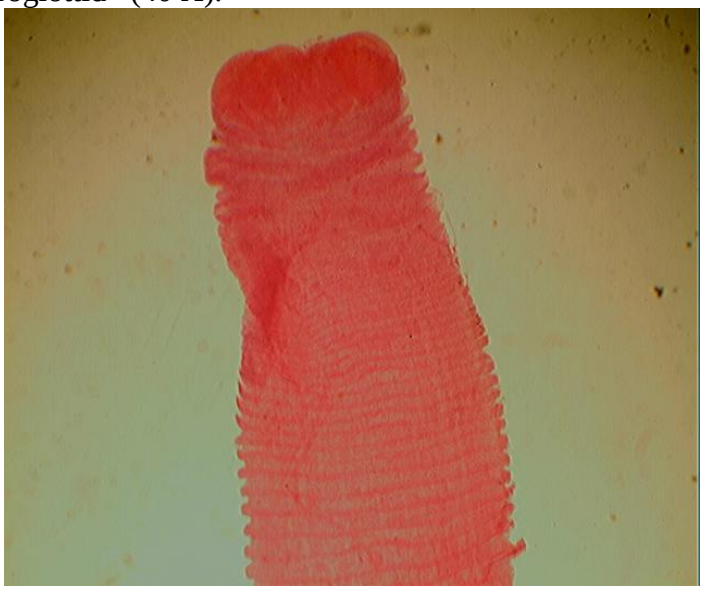
B A



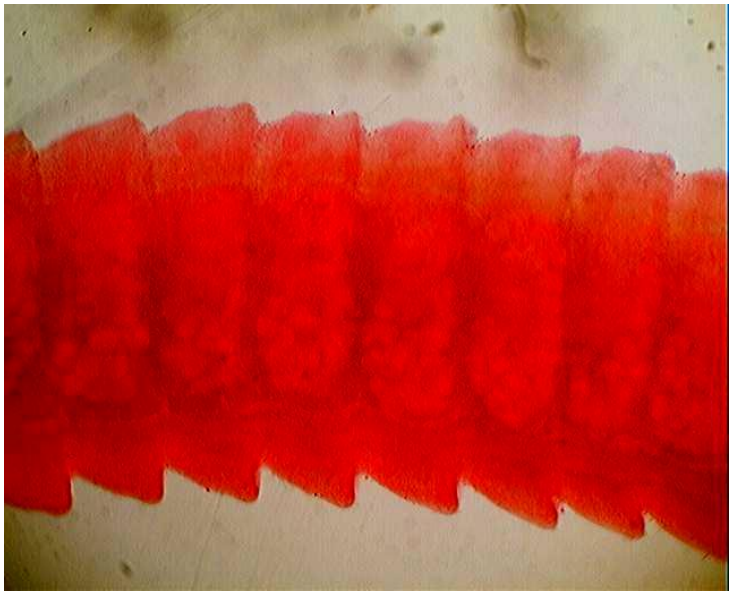
D C

Figure 4: ***Raillietina echinobothrida***(acetocarmine stain**).**
A- External morphology.
B - Scolex (20 X).
C- Mature proglottid (40 X).

D- Gravid proglottid (40 X).



A



B

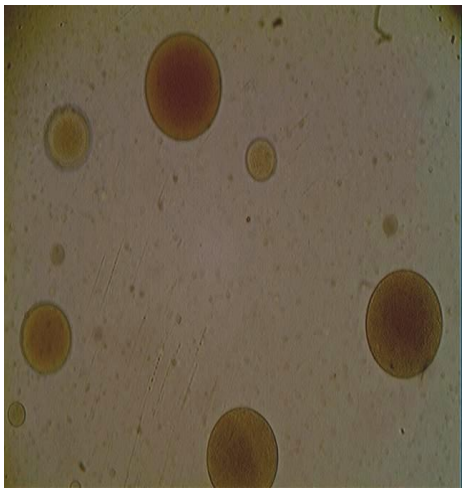
Figure: 5 *Raillietina cesticillus*(acetocarmine stain**).**
A- Scolex (20 X).

B- Gravid progllotide (40 X).

B

A

D



C

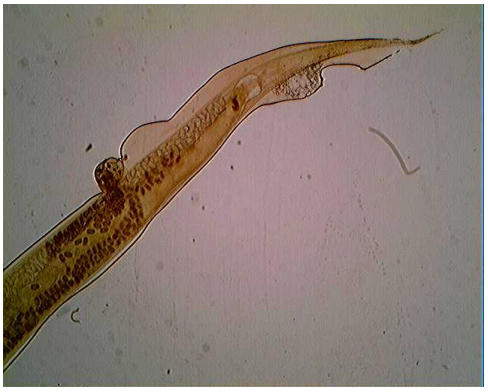
Figure 6: Ascaridia ***galli*** female
A- External morphology.
B- Anterior portion of female (4 X).
C- Posterior portion of female (4 X).
D- Uterus eggs (10 X).

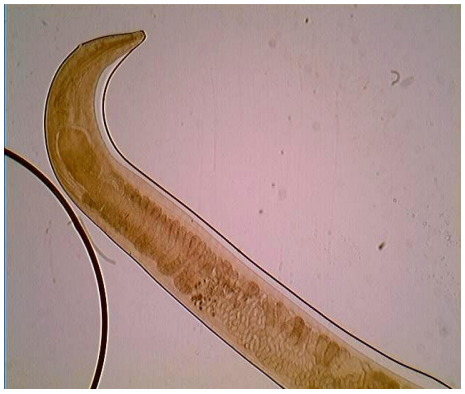
(Clearing by lacto phenol).

B

A

C





D

Figure 7: ***Heterakis gallinarum***

A- External morphology C, Anterior &posterior portion of male (20X).

B- Eggs. (40 X). D- Anterior & posterior portion of female (10 X).

(Clearing by lacto phenol).

B

A

D

C

Figure8: ***Amidostumum anseris***

A- Anterior portion of female (4X). C- (Eggs 10X)

B- Anterior portion of male (40X). D- Posterior portion of male (40X).

(Clearing by lacto phenol).

B

A

D

C

E

Figure 9: ***Dispharynx nasuta*** female

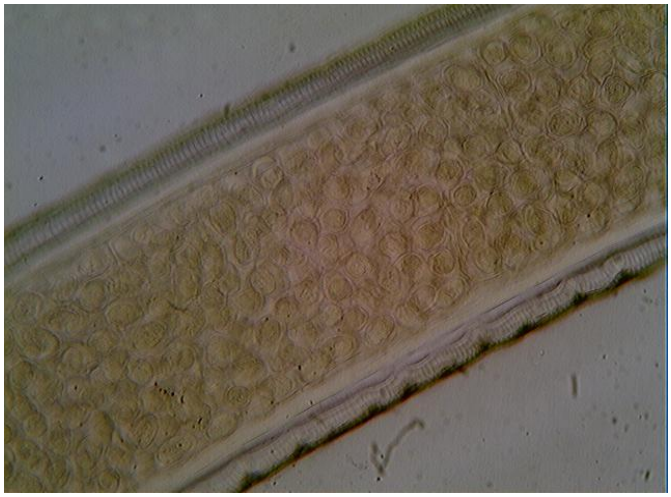
A, B- anterior and posterior portion (10 x).

C, D- anterior and posterior portion (40 x).

E- Eggs (40 xs). (Clearing by lacto phenol).

B

A



C

Figure 10: ***Epomidiostomum sp.***female
A – Anterior portion (20 xs).
B – Posterior portion (20 xs).
C - Eggs (40 xs).

(Clearing by lacto phenol).

Figure 11: External morphology of ***Tetrameres americana*** Female (40 X).

Discussion

The present study recorded a high infection prevalence of endoparasitises in local chickens .These findings in general are comparable with The prevalence rate of gastrointestinal parasites of scavenging chickens was reported to be 100% in Ghana (17) and previous reports(3, 5,7,8,9,10, 11,21) from different regions of Ethiopia and the world which ranging from 62 %-100% . The high prevalence of endoparasitises in the present study (97%) this might be due to the chickens pick up the parasites eggs directly by ingesting contaminated feed ,water, or by eating snails ,earthworms or other insects which can carry the parasites eggs ,This indicates the importance of gastro-intestinal helminthes in poultry farming in the region it might be a result of continuous exposure of chickens to the range conditions that facilitate infection. Local chickens satisfy their nutrient requirement by roaming from place to place and they usually seek their food in the superficial layers of the soil which is often contaminated with living organisms of all kinds, including various insects or earthworm that serve as paratenic or intermediate hosts for helminthes parasites that infest poultry(8).or might be due to continuous ingestion of infested droppings or infested intermediate hosts of organisms such as beetles, cockroaches, earthworm, flies and grasshoppers that are readily available to them in poorly managed stocks (5,18,19). The high prevalence of cestodes and nematodes in local chickens is associated with indiscriminate scavenging behavior.

Statistical analysis of the results revealed a significant difference ($P < 0.05$) between the prevalence rates of internal helminthes parasites in The most

prevalent cestode recorded in the area was *Raillietin aechinobothrida* (81.44%). This prevalence is higher than that previously reported in different parts of the world, as, Ghana &Zambia(81%), Zimbabwe (66.4%), Ethiopia (65.3%) ,Tanzania (0%),and Morocco(5.7%)(3,7,8,10,11,17,21). In a previous study, *R tetragona.* was found to affect 9.3% of the chickens in morocco 35.8% & 45.6% in Ethiopia ;23.9% in Nigeria and 59% in Ghana , a lower rate than that observed in the present study (59.79%). *Hymenolopis cantainana* and *Choanotenia infundibulum* were recorded at high prevalence (65.97%, 13.40 % respectively) higher than other studies(3, 5,7,8, 9,10, 11, 21),These differences in the prevalence rate of cestodes could be attributed to the differences in the prevailing environmental conditions and the time of sampling.

The most prevalent nematode in this study was *A. galli* (31.95%), which was also considered by previous workers to be the most widespread parasite infecting local chickens in the world (3, 5, 7, 8,9,10, 11,21) . The rate of infection by *A. galli* was higher in the lowland and midland areas in Ethiopia, Tanzania and Nigeria compared to the highlands. These variations could be due to differences in local environmental conditions, which support larval development and facilitate transmission (8) . Infestation with *A. galli* causes reduction in the growth rate and weight loss, which may be related to damage to the intestinal mucosa (6). *Ascaridia galli* significantly affects the health of chickens by sharing the food consumed by the host, thus causing stunted growth and reduced egg and meat production (20).

All the above studies indicated that ascaridiosis is a significant parasitosis of local chickens,
Heterakis gallinarum was detected in the small intestine and caecum of 24.74% of chickens, this result was lower than(21) in Zimbabwe (64.6%) and accepted with(17,3,11,5). Experimental infection has caused reduction in body weight and feed efficiency (22). *Amidostumum anseris* and *Tetramers sp*. were recorded in this study in low numbers (5.15% and 2.06%) this result of *Tetramers sp.* was lower than found by (7,9) 94%; 39% and higher than (10) 3.3%. *Amidostumum anseris* and *Epidimiostumum sp* were recorded for the first time in the chickens as intermediate host .(16) refers to presence of *Amidostumum anseris* in gizzard of duck, goose and pigeon.; *Amidostumum acutum* in duck and *Amidostumum raillieti* in duck and dove .While *Epidimiostumum sp.*was recorded in experrmentaly infections of chickens (16).

Mixed infections of two or more species of parasites per bird was common in the present study. This might be attributed to food preference at a particular time which determines the establishment
of mixed or single infection (23). The scavenging chicken feed on a wide range of diets, a habit that predispose them to parasitic infections (24) with many of the foods carrying infective stages of the parasites thereby serving as intermediate hosts in chickens that are free ranging. (2). In addition, the prevalence of some nematodes in the caecum could be attributed to their fairly developed digestive system which gives them greater chances of establishing a host-parasite relationship.

Most of the helminthes parasites were restricted to the small intestine, duodenum where there is optimum concentration of saline and glucose (25). or because that the preference for the small intestine by these parasites is to complement their physiological osmotic feeding nature where nutrients exist in dissolved form (24).

The present study revealed high prevalence of parasitic infection in local domestic chicken in Al-Diwaniya. There fore should be undertaken to control this economically important parasite and care of free ranging or domestic chickens from infections.

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